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Original Research

Paediatric femoral hernia – The diagnostic challenge

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ABSTRACT

Introduction: Femoral herniae are uncommon in childhood and pre-operative misdiagnosis is common. This can result in increased complications or inappropriate inguinal exploration. The aim of this retrospective study was to assess a tertiary centre's experience with paediatric femoral hernia over a 12 year period.

Methods: Children who underwent femoral hernia repair at a single centre were identified from a prospectively maintained database. Casenotes were reviewed for demographic data and details of presentation, operation and recurrence.

Results: Sixteen children with a median age of 7 (range 3–16) years were identified. One patient developed bilateral femoral herniae. All children were referred with a groin lump but in only one instance did the referring clinician establish the diagnosis of femoral hernia. Emergency repair was required in 2 patients (12%). Eleven femoral herniae were diagnosed following clinical assessment ultrasound. The remainder were identified intra-operatively following negative inguinal exploration. Intra-operatively the femoral canal was closed with sutures ($n = 16$) or mesh plug ($n = 1$). Only one patient had a laparoscopic repair. Two other patients underwent laparoscopy to confirm bowel viability ($n = 1$) and for inguinal canal assessment with subsequent open femoral hernia repair ($n = 1$). All patients were reviewed in surgical clinic and no morbidity or hernia recurrences were reported.

Conclusion: Femoral herniae are a diagnostic challenge and a high index of clinical suspicion is necessary. Ultrasonography or laparoscopy may be appropriate in equivocal cases. The long-term results of paediatric femoral hernia surgery are excellent.

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1. Introduction

Femoral herniae are uncommon in childhood, accounting for less than 1% of all groin herniae.^{1,2} Preoperative misdiagnosis ranges from 40 to 75%^{2,3,4}. This has been attributed to their relative rarity and a clinical presentation that may mimic other groin pathologies such as inguinal hernia, lymphadenitis and encysted hydrocoele.⁴ As a result there is an increased incidence of complications such as strangulation and perforation of the small bowel,⁵ and of inappropriate inguinal exploration being carried out.

Laparoscopy has been reported as a means of reducing misdiagnosis of groin herniae, as it allows inspection of all potential hernial orifices.⁶ Laparoscopy has been used as a safe and technically feasible approach for femoral hernia repair, although series to date have been small with relatively short follow-up periods.⁷

Although no consensus exists regarding the surgical treatment of choice for femoral hernia, it is well-documented that simple herniotomy without femoral canal repair carries an increased risk of recurrence.^{8,9}

Given the persistent problems associated with the diagnosis of femoral hernia and the lack of consensus regarding the optimum surgical strategy there is a need for contemporary descriptive data. Therefore the aim of this study was to evaluate a single tertiary centre's experience with paediatric femoral hernia.

2. Methods

Children who underwent femoral hernia repair at a single institution (Royal Hospital for Sick Children, Edinburgh, UK) between 1997 and 2008 were identified from a prospectively maintained database.

A retrospective case note review was then performed. Data collected included sex, laterality, presenting symptoms, age at presentation, duration of symptoms, previous inguinal surgery, preoperative diagnosis, surgical approach and technique, the presence and contents of a hernia sac, postoperative complications and follow-up details.

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Table 1
Provisional diagnosis from referring clinician.

Inguinal hernia	9 (53%)
Lymphadenopathy	3 (18%)
Hydrocoele	2 (12%)
No referral letter/provisional diagnosis	2 (12%)
Femoral hernia	1 (6%)

3. Results

Sixteen children, 10 female (63%) and 6 male (37%), underwent 17 femoral hernia repairs during the study period. Over the same period 2178 inguinal herniotomies were performed, suggesting a femoral to inguinal ratio of 1:136 (0.73%). Median age at presentation was 7 years (range 3–16 years). Fourteen herniae (82%) were right-sided and three (18%) left-sided. One patient had bilateral femoral herniae, with a 1 year interval between presentations. Elective repair was undertaken in 15 (88%) cases. Two patients, neither of whom had previously been aware of a groin lump, required an emergency procedure due to incarceration. All children had been referred with a groin lump but in only one instance did the referring clinician correctly establish the diagnosis of femoral hernia (Table 1). The lump was painful in 7 (41%), enlarging in 3 (18%) and irreducible in 3 (18%) cases. No patient developed signs or symptoms of small bowel obstruction. Duration of symptoms at presentation ranged from 1 day to 10 years.

11 cases were correctly diagnosed after assessment by a paediatric surgeon, giving a preoperative misdiagnosis rate of 35%. Following surgical review, ultrasonography had been used in seven cases to investigate a suspected femoral hernia, and was confirmatory on five occasions. In one case it resulted in misdiagnosis of the femoral hernia as a hydrocoele of the cord. In the remaining case ultrasonography was equivocal and therefore laparoscopy was performed.

Laparoscopy was performed in two other patients. One had presented with an incarceration and laparoscopy was performed to confirm the bowel viability. The final patient had been scheduled

for a laparoscopic inguinal hernia repair. At laparoscopy a closed internal ring was visualised and a femoral hernia identified, the surgeon then proceeded to an open femoral hernia repair.

The 6 patients who were initially misdiagnosed were found to have a femoral hernia intra-operatively following a negative inguinal exploration (Fig. 1). Two of these 6 patients had previously undergone ipsilateral inguinal exploration. One of these patients underwent an inguinal herniotomy but represented 3 weeks later with a groin lump and was found to have a femoral hernia at repeat groin exploration. The second underwent ligation of a patent processus vaginalis for what was thought to be a hydrocoele of the cord. This groin lump persisted and at laparoscopy a femoral hernia was demonstrated.

In sixteen cases the hernia was repaired by an open technique, and in one case laparoscopic repair was undertaken. Of those repaired by open techniques, a high incision was made in eight (47%) and a low incision in six (38%) cases. In one emergency case an initial low incision was made but then a separate high incision was necessary to help with reduction and inspection of the sac. Details of the surgical approach were not available for the remaining case. A hernia sac was identified and inspected in 13 cases, of which nine were empty, two contained adipose tissue and one contained omentum. There was no clear comment about sac contents in the remaining four operation notes. In every case the femoral canal was closed. This was achieved by a number of operative techniques. Only 1 patient had a mesh plug used. The remainder underwent suture repair with absorbable vicryl or polydioxanone sutures being used to close the canal in fifteen cases and non-absorbable ethibond being used in one case.

All patients were reviewed between 1 and 3 months post-operatively and discharged at that time in the absence of complications. No postoperative complications or femoral hernia recurrence were detected. One patient was diagnosed with a suspected ipsilateral inguinal hernia 3 years post femoral hernia repair, although neither an inguinal nor femoral hernia sac was identified upon repeat groin exploration.

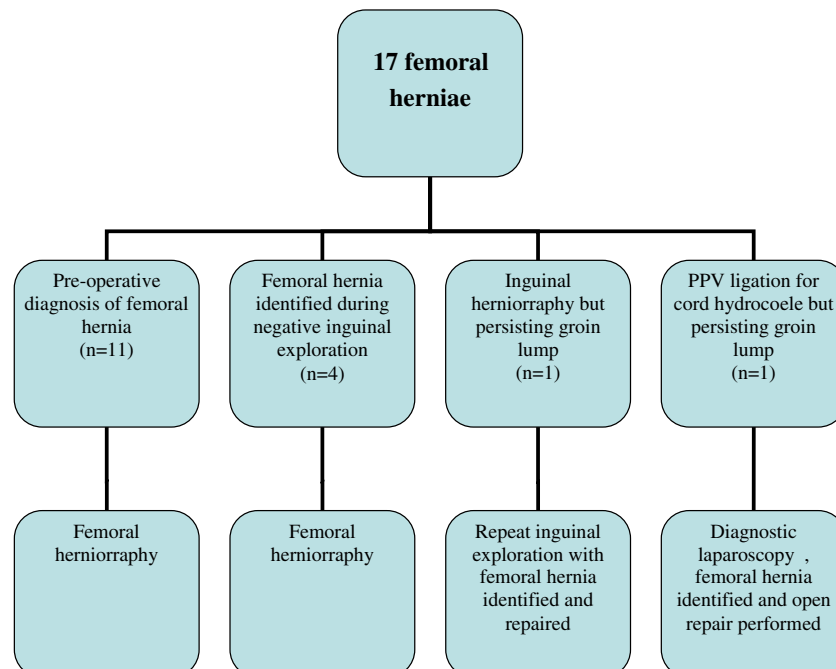


Fig. 1. Flowchart showing management of 17 femoral herniae.

4. Discussion

Femoral herniae are a rare pathology in children. This study reports an incidence of 0.73% of all groin herniae, which is consistent with previously published figures of 0.3–1%^{3,10,11}. However data from the laparoscopic era does suggest that a higher rate of femoral herniation may be detected if laparoscopy is performed.¹² A near-equal sex distribution is widely described^{3,10,13} although in our study a female predominance of 63% was found. Right-sided femoral herniae constitute 58–77% of cases in published literature^{3,4} and 82% in our series. Femoral herniae are rarely seen in infancy, accounting for less than 10% of all cases.^{4,10} In this experience the youngest age at presentation was 3 years and the median age at repair was 7 years. This age distribution is believed to reflect the role of both congenital and acquired factors in their development. Although the aetiology of femoral hernia remains unclear, many surgeons endorse McVay and Savage's hypothesis that a congenitally narrow insertion of the posterior inguinal wall on to Cooper's ligament results in enlargement of the femoral ring, and predisposes to herniation in the event of raised intra-abdominal pressure.¹⁴ Previous inguinal herniotomy has been proposed as a further aetiological factor, although many believe that this association is spurious and reflects a missed femoral hernia.^{3,8,15}

The classical presentation of a femoral hernia is a lump below and lateral to the pubic tubercle that is not controlled by digital occlusion of the internal inguinal ring.¹⁶ Cases of femoral hernia presenting with small bowel obstruction and intestinal or ovarian strangulation are well described in the published literature, but were not encountered in this series. This study reported a misdiagnosis rate of 35%, which is slightly less than previous reports of 45–75%.^{2–4,13} These studies suggest this may be a result of insufficient physical examination, failure to include femoral hernia in the differential diagnosis, and inadequate exploration at surgery.^{3,8,17}

In cases that present with a suggestive history but normal or equivocal examination findings, ultrasonography can be used as an accurate and non-invasive adjunct.¹⁸ In this study, ultrasonography was used in seven instances and was confirmatory in five. A study by Chen reported 100% accuracy in the diagnosis of rare groin hernia when using preoperative ultrasound to investigate a presumed indirect inguinal hernia.¹⁹ In the acute setting ultrasonography can be of particular use for differentiating between an incarcerated femoral hernia and inguinal lymphadenitis.

In this series 6 femoral herniae were clinically misdiagnosed but then correctly identified upon surgical exploration. Two of these patients had undergone previous ipsilateral inguinal exploration. In the absence of inguinal pathology at exploration, failure to explore the femoral canal can greatly increase morbidity. A delay in appropriate management of a femoral hernia can be associated with an increased incidence of intestinal necrosis and perforation,¹¹ and persistence of the groin lump after exploration necessitates reoperation. De Caluwé reported that 39% of misdiagnosed femoral herniae consequently required re-exploration due to persistence or recurrence of a groin lump postoperatively.²

The methods of femoral hernia management in children are varied, ranging from simple dissection and ligation of the hernial sac to laparoscopic repair and mesh-plug occlusion of the femoral canal.^{7,20} Whilst the ideal surgical technique for femoral hernia repair remains a matter for debate, repair of the femoral canal is widely advocated due to reports of increased recurrence following simple.^{3,4,15} In this series absorbable vicryl or polydioxanone sutures were used to close the femoral canal in fifteen cases. Many comparable series favour non-absorbable.^{4,20} Schier has reported

an increased recurrence rate upon use of absorbable material for inguinal herniorrhaphy.⁶ No cases of recurrence were observed in this series suggesting that absorbable sutures can safely be used for femoral hernia repair.

In conclusion, femoral herniae are a rare and diagnostically challenging presentation in childhood. Their delayed or incorrect diagnosis can potentially cause significant morbidity. This study suggests that if every groin lump in a child is regarded with a high index of suspicion, the majority of cases can be correctly diagnosed following careful clinical examination alone. However, in equivocal or atypical cases, sonography and laparoscopy may be useful adjuncts. Due to the frequency of misdiagnosis, paediatric surgeons must consider femoral herniation in all cases of negative inguinal exploration. The longer-term results of paediatric femoral hernia surgery are excellent with no morbidity or recurrence being reported in this series.

Ethical approval

None.

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None.

Conflict of interest

None.

Author contribution

Marie Wright: data collection, writing; John Scollay: writing, data collection; Amanda McCabe: study design, data analysis, manuscript revision; Fraser Munro: study design, data analysis, manuscript revision.

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